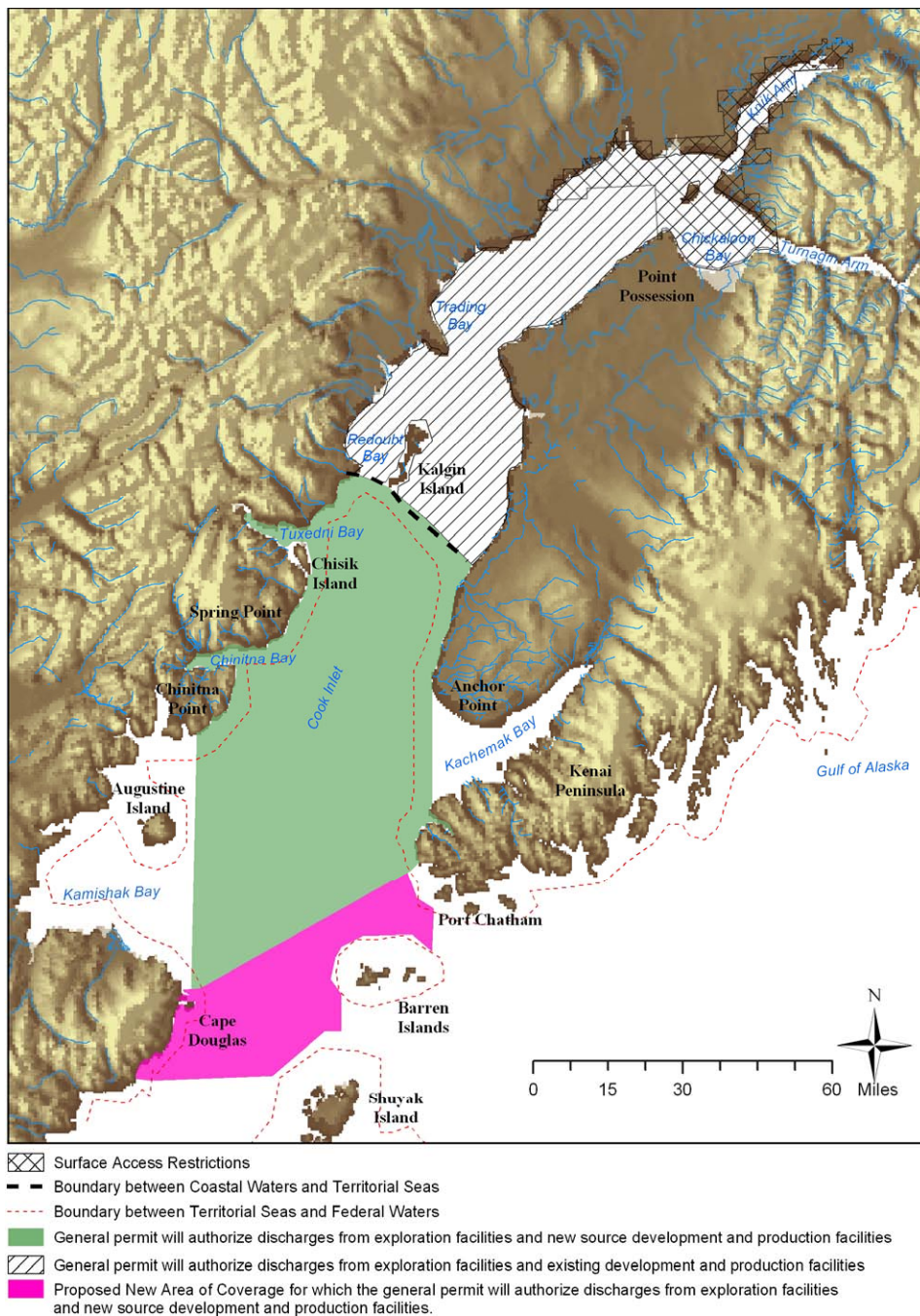


OCEAN DISCHARGE CRITERIA EVALUATION FOR THE COOK INLET NPDES PERMIT



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Prepared for:
U.S. EPA, Region 10
Office of Water
NPDES Permits Unit



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ACRONYMS

AAC	Alaska Administrative Code
ACMP	Alaska Coastal Management Program
AMSA	Alaska Meriting Special Attention
AOGCC	Alaska Oil and Gas Conservation Commission
BAT	Best available pollution control technology economically achievable
bbl	barrel
BCT	Best conventional pollution control technology
BOD	biochemical oxygen demand
BPT	Best practicable control technology
CFR	Code of Federal Regulations
CMP	Coastal Management Plan
COD	chemical oxygen demand
CWA	Clean Water Act
CZMP	Coastal Zone Management Program
EFH	Essential Fish Habitat
ELG	effluent limitations guidelines
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FC	fecal coliform
GC/MS	gas chromatography/mass spectrometry
gpd	gallons per day
gpm	gallons per minute
HPC	Habitat of Particular Concern
ITL	Information to Lessee (clauses)
KPB	Kenai Peninsula Borough
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
OCS	Outer Continental Shelf
ODCE	Ocean Discharge Criteria Evaluation
ppm	parts per million
ppt	parts per thousand
SBF	Synthetic-Based Drilling Fluids
TSS	total suspended solids
UOD	Ultimate Oxygen Demand
USFWS	U.S. Fish and Wildlife Service
WBF	Water-Based Drilling Fluids

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1.0 INTRODUCTION

1.1 PURPOSE OF EVALUATION

The U.S. Environmental Protection Agency (USEPA) intends to reissue the National Pollution Discharge Elimination System (NPDES) General Permit for Oil and Gas Exploration, Development, and Production Facilities in state and federal Waters in Cook Inlet, Alaska. Section 403(c) of the Clean Water Act (CWA) requires that NPDES permits for such ocean discharges be issued in compliance with EPA's Ocean Discharge Criteria for preventing unreasonable degradation of ocean waters. The purpose of this Ocean Discharge Criteria Evaluation (ODCE) report is to identify pertinent information and concerns relative to the *Ocean Discharge Criteria* and discharges from oil and gas exploration, development, and production facilities.

EPA's *Ocean Discharge Criteria* (40 [Code of Federal Regulations (CFR)] CFR Part 125, Subpart M) set forth specific determinations of unreasonable degradation that must be made prior to permit issuance. "Unreasonable degradation of the marine environment" is defined (40 CFR 125.12[e]) as follows:

1. Significant adverse changes in ecosystem diversity, productivity, and stability of the biological community within the area of discharge and surrounding biological communities
2. Threat to human health through direct exposure to pollutants or through consumption of exposed aquatic organisms
3. Loss of aesthetic, recreational, scientific, or economic values, which are unreasonable in relation to the benefit derived from the discharge

This determination is to be made on the basis of considering the following 10 criteria (40 CFR 125.122):

1. The quantities, composition, and potential for bioaccumulation or persistence of the pollutants to be discharged
2. The potential transport of such pollutants by biological, physical or chemical processes
3. The composition and vulnerability of the biological communities that may be exposed to such pollutants, including the presence of unique species or communities of species, the presence of species identified as endangered or threatened pursuant to the Endangered Species Act (ESA), or the presence of those species critical to the structure or function of the ecosystem, such as those important for the food chain

4. The importance of the receiving water area to the surrounding biological community, including the presence of spawning sites, nursery/forage areas, migratory pathways, or areas necessary for other functions or critical stages in the life cycle of an organism
5. The existence of special aquatic sites including, but not limited to, marine sanctuaries and refuges, parks, national and historic monuments, national seashores, wilderness areas, and coral reefs
6. The potential impacts on human health through direct and indirect pathways
7. Existing or potential recreational and commercial fishing, including finfishing and shellfishing
8. Any applicable requirements of an approved Coastal Zone Management Plan
9. Such other factors relating to the effects of the discharge as may be appropriate
10. Marine water quality criteria developed pursuant to Section 304(a)(1)

If the Regional Administrator determines that the discharge will not cause unreasonable degradation to the marine environment, an NPDES permit may be issued. An individual NPDES permit may be issued for distinct locations within Cook Inlet necessitating special consideration due to sensitivity or biological concern. If the Regional Administrator determines that the discharge will cause unreasonable degradation of the marine environment, an NPDES permit may not be issued.

If the Regional Administrator has insufficient information to determine, prior to permit issuance, that there will be no unreasonable degradation to the marine environment, an NPDES permit will not be issued unless the Regional Administrator, on the basis of the best available information, determines that all of the following are true:

1. such discharge will not cause irreparable harm to the marine environment during the period in which monitoring will take place.
2. there are no reasonable alternatives to the onsite disposal of these materials.
3. the discharge will be in compliance with certain specified permit conditions (40 CFR 125.122).

Irreparable harm is defined as “significant undesirable effects occurring after the date of permit issuance, which will not be reversed after cessation or modification of the discharge” (40 CFR 125.121[a]).

1.2 SCOPE OF EVALUATION

This document evaluates the impacts of discharges as provided for by the NPDES general permit proposed for oil and gas exploration, development, and production facilities in federal and state waters in Cook Inlet.

This document relies extensively on information provided in the *Cook Inlet Planning Area Oil and Gas Lease Sales 191 and 199 Final Environmental Impact Statement* (MMS 2003); the proposed NPDES general permit; the proposed NPDES general permit fact sheet; the *Draft Biological Evaluation for the Cook Inlet NPDES Permit* (Tetra Tech 2005a); the *Ocean Discharge Criteria Evaluation for the Forest Oil Osprey Platform, Redoubt Shoal Unit Development Project* (SAIC 2001); and the *Environmental Assessment for the New Source NPDES Forest Oil Redoubt Shoal Unit Production Oil and Gas Development Project* (SAIC 2002). For more detailed information concerning certain topics, where appropriate, this document will refer you to these publications. The information presented in this ODCE is a synthesis of the information in these documents in addition to findings published in scientific literature.

1.2.1 Area of Coverage of the Proposed NPDES General Permit

This document evaluates the impacts of waste discharges as provided for by the NPDES general permit proposed for oil and gas extraction, development, and production facilities pursuant to Section 403(c) of the CWA.

The proposed NPDES general permit addresses discharges from three types of platform-based oil and gas operations: exploration, development, and production. A single facility can conduct development and production operations at the same time. A single facility, however, rarely engages in exploratory operations in conjunction with either development or production activities. The proposed NPDES general permit also addresses discharges from specified onshore facilities. These onshore facilities typically involve different discharges than platform-based operations.

The existing NPDES general permit covers oil and gas facilities in Cook Inlet north of a line extending between Cape Douglas (at 58°51' latitude, 153°15' longitude) on the west and Port Chatham (at 59°13' latitude, 151°47' longitude) on the east, except the prohibited areas described in section 1.2.2. The proposed NPDES general permit expands the existing NPDES general permit's coverage area to include areas under the Minerals Management Service (MMS) Lease Sales Nos. 191 and 199, some of which lie outside the southern boundary of the existing NPDES general permit's coverage area as well as the territorial seas adjoining the MMS Lease Sales. The proposed NPDES general permit coverage area, however, does not include the areas identified under the MMS Lease Sales as the Lower Kenai Peninsula Deferral Area and the Barren Island Deferral Area. In general, the expanded coverage area includes the entire Cook Inlet north of Shuyak Island, with the exception of several bays and sensitive areas described in the following. (Figure 1)

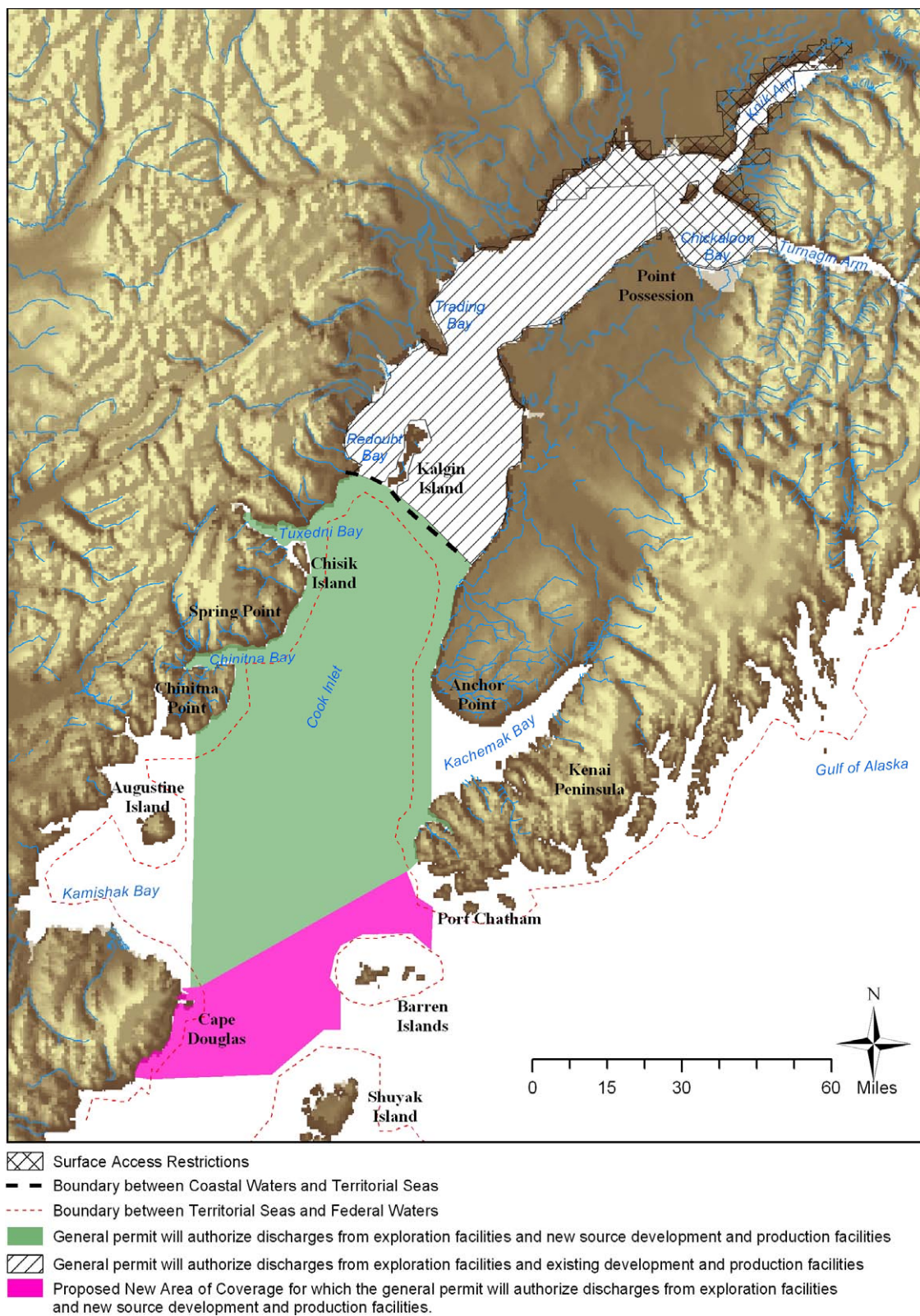


Figure 1. Proposed NPDES permit areas.

1.2.2 Prohibited Areas of the Proposed NPDES General Permit

EPA proposes to continue the discharge prohibitions in the existing NPDES general permit in the following areas:

- In water depths less than the 10 meter mean lower low water (MLLW) isobath for exploration facilities
- In water depths less than the 5 meter MLLW isobath for all facilities
- Shoreward of the 5.5 meter isobath adjacent to either (1) the Clam Gulch Critical Habitat Area (Sales 32, 40, 46A, and 49) or (2) from the Crescent River northward to a point one-half mile north of Redoubt Point (Sales 35 and 49)
- Minerals Management Service Lower Kenai Peninsula deferral area and Barren Island Deferral area, including the area between the deferral areas and the shore
- In Kamishak Bay, west of a line from Cape Douglas to Chinitna Point
- In Chinitna Bay, inside of the line between the points of the shoreline at latitude 59°52'45" N, longitude 152°48'18" W on the north and latitude 59°46'12" N, longitude 153°00'24" W on the south
- In Tuxedni Bay, inside of the lines on either side of Chisik Island
 - From latitude 60°04'06" N, longitude 152°34'12" W on the mainland to the southern tip of Chisik Island (latitude 60°05'45" N, longitude 152°33'30" W)
 - From the point on the mainland at latitude 60°13'45" N, longitude 152°32'42" W to the point on the north side of Snug Harbor on Chisik Island (latitude 60°06'36" N, longitude 152°32'54" W)

The existing NPDES general permit prohibits discharges in waters with a depth less than 5 meters for all facilities, and less than 10 meters for exploration facilities. This is because shallow water discharges are less dispersed than deeper water discharges and, thus, have a greater potential to impact the abundant aquatic life found in them.

The existing NPDES general permit prohibits discharges in parts of Chinitna, Tuxedni, and Kamishak Bays because they are either areas of high resource value, or are adjacent to areas of high resource value. In addition, Kamishak Bay is a known net depositional environment where drilling fluid solids and other pollutants will likely accumulate if discharges are authorized in that area.

In addition to the discharge prohibitions described above, the proposed NPDES general permit would prohibit discharges in the following areas:

- In Shelikof Strait south of a line between Cape Douglas (at 58°51' N, 153°15' W) on the west and the northernmost tip of Shuyak Island on the east (at 58°37' N, 152°22' W)
- Within 20 nautical miles of Sugarloaf Island as measured from a centerpoint at 58°33' N and 152°02' W
- Within the boundaries, or within 4,000 meters (expanded from 1,000 meters in the existing NPDES general permit) of a coastal marsh, river delta, or river mouth, or a designated Area Meriting Special Attention (AMSA), State Game Refuge (SGR), State Game Sanctuary (SGS), Critical Habitat Area (CHA), or National Parks. (The seaward edge of a coastal marsh is defined as the seaward edge of emergent wetland vegetation)

The Shelikof Strait area described above was outside of the existing NPDES general permit coverage area. The National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) has designated Shelikof Strait as a special aquatic foraging area for the Stellar Sea Lion. See 58 Federal Register (FR) 45278 (September 27, 1993); see also 50 CFR 226.12(c)(1). Therefore, the proposed NPDES general permit prohibits discharges in Shelikof Strait.

To comply with the Coastal Zone Management Plan's prohibitions on the discharge of silty materials to certain areas and activities that potentially alter protected biological resources, the existing NPDES general permit prohibits discharges within 1,000 meters of a coastal marsh, river delta, or river mouth, or an AMSA, SGR, or CHA. In the proposed NPDES general permit, EPA proposes to expand this prohibition to a distance of 4,000 meters to afford better protection of these sensitive areas. EPA knows of no plans for oil and gas facilities to operate in those areas, so the change should not have an impact on any of these facilities. With modern drilling technologies, there should be no need to operate within the expanded buffer zone. The following SGRs, SGSs, CHAs, AMSAs, and National Park are in the proposed NPDES general permit coverage area:

Anchorage Coastal Wildlife Refuge
Clam Gulch CHA
Goose Bay SGR
Kachemak Bay CHA
Kalgin Island CHA
Lake Clark National Park
McNeil River SGS

Palmer Bay Flats SGR
Port Graham/Nanwalek AMSA
Potter Point SGR
Redoubt Bay CHA
Susitna Flats SGR
Trading Bay SGR

Alaska Statute (AS) section 16.20 contains the legal descriptions of these state specialty areas. The present boundaries of these state special areas are described in a document titled the *State of Alaska Refuges, Critical Habitat Areas, and Sanctuaries*, prepared by

the Alaska Department of Fish and Game, Habitat Division, dated March 1991. Further information may also be obtained from the Alaska Department of Natural Resources, Office of Habitat Management and Permitting, 550 West 7th Avenue, Suite 1420, Anchorage, Alaska, 99501; phone (907) 269-8690.

1.2.3 Regulatory Status Classification of Waters Within Area of Coverage

The proposed NPDES general permit includes a classification of the regulatory status of waters within the area of coverage as one of the following categories:

- ***Coastal Waters***: the portion of Cook Inlet north of the southern edge of Kalgin Island (Northern Cook Inlet)
- ***Offshore Waters***: the area of Cook Inlet south of the coastal waters (Southern Cook Inlet)
 - ***Territorial Seas***: the first 3 miles of the Offshore Waters of Southern Cook Inlet measured from the coastline or the boundary between coastal and offshore waters
 - ***Federal Waters***: the portion of the Offshore Waters of Southern Cook Inlet seaward of the territorial seas, which is defined as the contiguous zone, which is the adjacent portion of the ocean

Specific limitations and monitoring requirements for each of these categories are set forth in the proposed NPDES general permit and will be discussed in the following sections as appropriate.

1.2.4 Classification of Discharges

The proposed NPDES general permit includes a classification of discharges from platform-based oil and gas operations. Discharges can be from one of the following categories:

- ***Exploratory Operations*** are conducted to determine the nature of potential hydrocarbon reserves. Drilling is the main activity during exploratory operations. Wastewater discharges from exploratory operations typically include drilling fluids; drill cuttings and washwater; deck drainage; sanitary wastes; domestic wastes; desalination unit wastes; blowout preventer fluid; boiler blowdown; fire control system test water; noncontact cooling water; uncontaminated ballast water; uncontaminated bilge water; excess cement slurry; mud, cuttings, and cement at the seafloor; and well completion fluids. In general, exploratory facilities do not discharge waterflood wastewater, produced water, or well treatment fluids.
- ***Development Operations*** consist of drilling and completion of producing wells, which can be conducted from fixed or mobile facilities. Discharges associated with development operations include all those listed above for exploratory

operations. In addition, generally, facilities engaged in development operations discharge produced water and well treatment fluids.

- ***Production Operations*** consist of the active recovery of hydrocarbons from producing formations after development has been completed. Facilities conducting production operations are likely to discharge produced water, well treatment fluids, workover fluids, deck drainage, sanitary wastes, domestic wastes, desalination unit wastes, blowout preventer fluid, boiler blowdown, fire control system test water, noncontact cooling water, uncontaminated ballast water, and uncontaminated bilge water. Some production operations also discharge waterflood wastewater, which is used to enhance production from older fields. In general, facilities engaged slowly in production do not discharge drilling fluids, drill cuttings, well completion fluids, or mud, cuttings, and cement at the seafloor, except when wells are worked over.
 - Some existing production platforms are equipped to separate oil and gas from produced water; these platforms then discharge produced water directly to Cook Inlet.
 - Other production platforms, however, perform only initial oil/water separation, and route their produced water to *onshore facilities* for further treatment; in these cases, produced water is discharged from the onshore facility.

Specific limitations and monitoring requirements for each of these categories are set forth in the proposed NPDES general permit and will be discussed in the following sections as appropriate.

1.3 OVERVIEW OF REPORT

This evaluation focuses on sources, fate, and potential effects of discharges of exploratory, development, and production activities from platform-based oil and gas operations on various groups of aquatic life. The types and projected quantities of discharges are detailed in Section 2.0. Anticipated amounts or volumes of wastes, approximate chemical composition, and concentrations are also given. The fate, transport, and persistence of the wastes is examined in Section 3.0, which covers dilution, dispersion, and persistence of discharged constituents in relation to influential receiving water properties, including water depth, ice coverage, currents, wind, and waves. Before discussing potential biological or ecological effects, an overview of aquatic communities and important species is presented in Section 4.0. The means by which platform-based oil and gas operation discharges could impact marine life and concentrations at which effects have been documented are presented in Section 5.0. Section 6.0 summarizes the *biological evaluation* of endangered and threatened species required by the Endangered Species Act (ESA). Especially important uses and plans for the proposed NPDES general permit area, including commercial, recreational and subsistence harvests, special aquatic sites, and coastal zone management plans, are discussed in Sections 7.0 and 8.0.

Section 9.0 discusses the compliance of expected discharges with federal and state water quality criteria. Section 10.0 summarizes the findings of this report and Section 11.0 presents recommendations for monitoring marine life that could be affected by discharges in the proposed NPDES general permit area.